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ABSTRACT

This booklet is one architectural firm's presentation of understanding and applying the latest educational research in real-world settings. It asserts that achitects can make significant contributions to education by designing schools that uniquely facilitate improvements in organizational structure, learning methods, or both. It presents lessons learned about designing schools and about the process and the planning that are required to align facilities with programs, and architecture with education. The booklet provides examples of environments shaped by attention to communities' individual needs, including small schools, project-based learning, and community schools. Following an introduction, the discussion is broken into the following chapters: (1) "Schools That Fit"; (2) "Toward Better Schools"; (3) "Schools That Fit Communities"; (4) "Schools That Fit Education Leaders"; (5) "Schools That Fit Teachers"; (6) "Schools That Fit Learners"; and (7) "Schools That Fit Children." (Contains a list of 16 resources.) (EV)

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Schools That Fit

Aligning Architecture and Education

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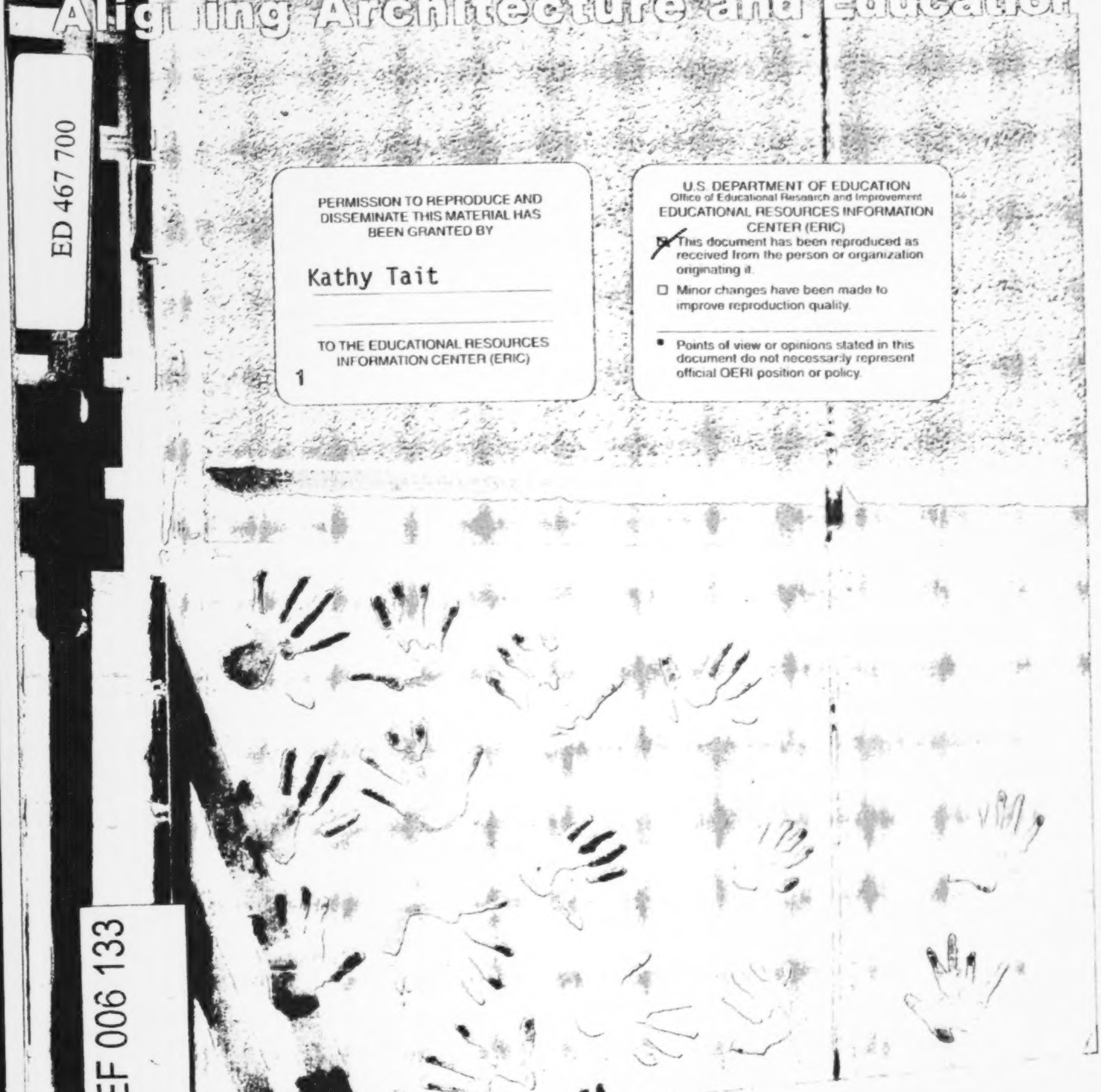

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Schools That Fit

Aligning Architecture and Education

Cuningham Group would like to dedicate this book to the creative educators around the world who choose to spend their lives helping others learn.

Cuningham Group thanks the following individuals for their assistance with this project

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Preface

As architects involved in education, we are fortunate to have the opportunity to shape the environment into successful learning places. The definition of success, however, is unique for each community we work with. At Cuningham Group we know successful design is architecture informed by and responsive to research, learning philosophy, the community and, ultimately, the learners themselves. We believe this approach establishes a unique physical response representative of the community's educational philosophy, cultural heritage and values. What this means for us is we must remain knowledgeable about learning theory, the latest educational research and the individual communities where we work. We continually seek to discuss, process and express this understanding into built forms that are directly relevant to our clients needs.

This book is our way of sharing what we have learned and providing you with examples of environments shaped by learning. Whatever your issues are - small schools, project-based learning or community schools, for example - we will show you how we have worked with a wide variety of learning communities to directly apply these principles to their projects.

In our journey of shaping this book, one of the hardest tasks was determining its title. Our exploration began as a discussion about current research on school size, but it resulted in a broader understanding of the key to success -successful learning environments grow from the community and build on the many different resources communities have to offer. Hence, the title, **Schools That Fit**.

Our learning journey continues, and with each new client or project our knowledge and understanding expands. Finding what makes schools that fit in your community starts with an exploration of your values and vision. We offer this book as a resource to help you explore how you might create **Schools That Fit** your community.

Our thanks to the many individuals who participated in this journey. Their commitment to creating successful learning places is the inspiration for all we do.

Cuningham Group®

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Aligning Architecture and Education

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Introduction

Education is the movement from darkness to light.

Allan Bloom

Designing solutions to address aging and overcrowded schools present unique challenges to educators and architects—especially in light of research that suggests that schools would be more effective if they were smaller and if they were refocused to accommodate a broader range of learning styles.

Research demonstrates that smaller schools deliver superior student achievement, improve student behavior and improve teacher performance and satisfaction. Small is not the only frontier in education, however. Educators are also paying considerable attention to learning styles, placing a greater emphasis on hands-on and interdisciplinary learning activities. We find the research on school size and learning methods to be persuasive. The communities we work with, however, interpret and react to research and trends in education in quite different ways. Each community must identify its own unique needs and vision for education, sorting through many competing agendas and priorities.

Our obligation as architects is to give communities not one ideal blueprint for a school that will be identical here, there or anywhere, but rather create a school that helps learners succeed in an educational environment that fits—uniquely fits—their vision, their community, their leaders, their teachers, their learners, and their children.

Communities

The design of schools that fit communities begins with the educational vision and objectives of a community. We developed and use a Vision-Based Planning approach that helps communities identify and reach consensus on that vision. When appropriate, during that process, we question, challenge, propose alternatives and introduce what we believe is the best of theory and research. The result is an educational programming document that informs the design process at every step. The resulting facilities reflect both the unique identity and culture of a community and its educational vision.

Leaders

Schools also must fit education leaders. Architects can assist education leaders in reaching consensus on community goals and by ensuring that school designs are aligned with community educational priorities. Further, the design of facilities can contribute significantly to efficient management of those facilities; especially the smaller, decentralized facilities that research suggests are most effective. Finally, concerns with safety and security can be addressed, in part, through careful design.

Teachers

Teachers play a critical role in the success of innovative programs. They should be important contributors to a consensus on educational programs and facilities to achieve a good fit. Moreover, because teachers are being asked to make such sweeping changes in how they work, schools must provide facilities that give them the best chance to succeed.

Learners

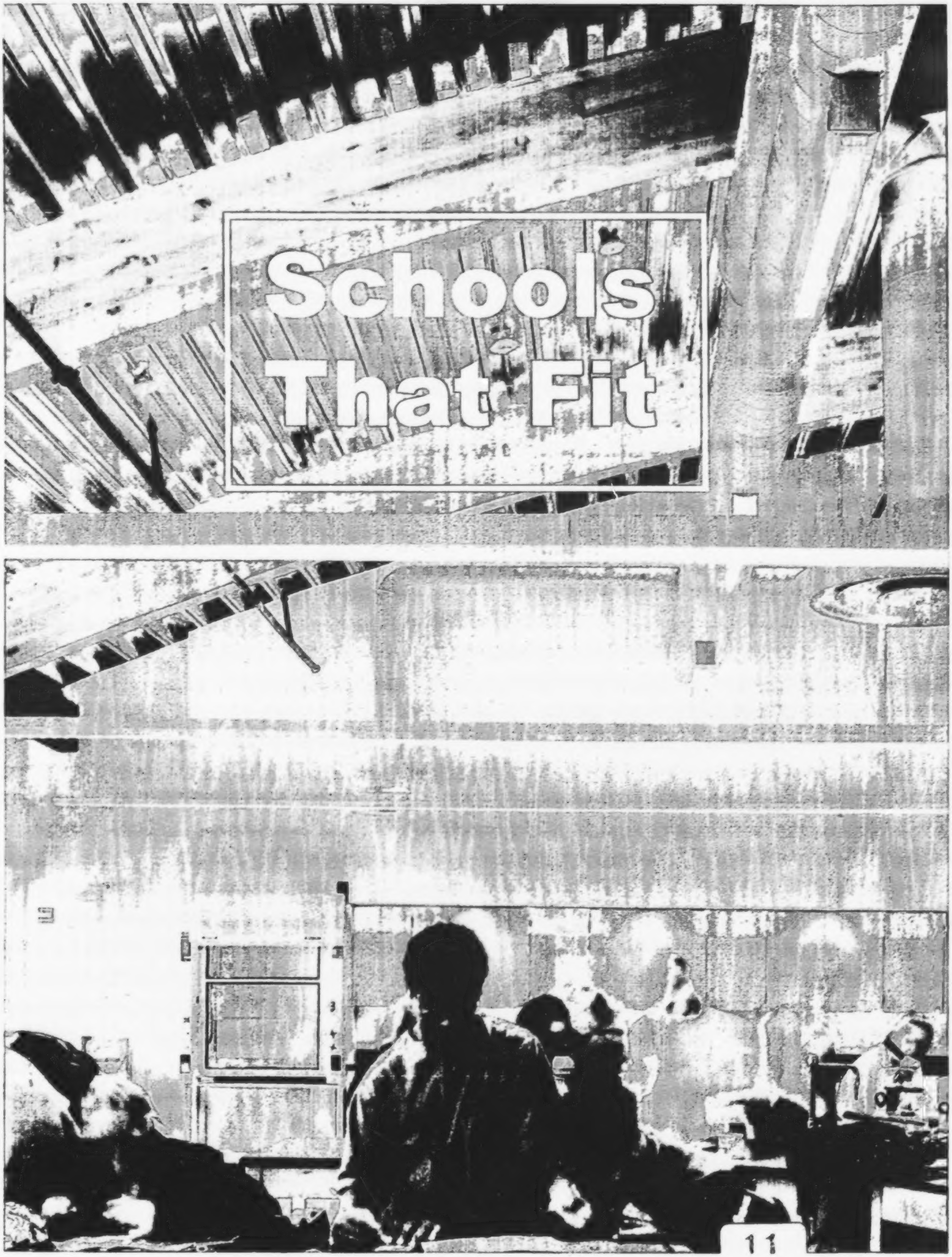
Of course the focus of all educational programs and facilities must be the learners. Whether communities place a priority on organizational structure, learning methods, or both, facilities can enhance performance. New configurations of space can promote hands-on, interdisciplinary learning that engages learners and helps them make connections between school and their lives. In addition, efficient designs provide space for students to learn by themselves, in small groups or larger groups—a must in many new project-based curricula.

Children

Finally, facilities intended primarily for children should meet the child's need for comfort, security and stimulation. The definition or scale of spaces, as well as the use of color, texture and light, all contribute to making children more comfortable, secure and open to learning. Those elements combine also to appeal to a child's sense of playfulness—something that's been missing in so many traditional schools.

Much of our work in creating effective schools takes us beyond design. We venture respectfully into the realm of educators in an effort to understand the theory and practice of education. Without that understanding we could not be effective contributors to or interpreters of discussions on educational vision and objectives. Without them, we could not improve the learning process by aligning facilities with program and architecture with education, creating facilities that uniquely fit the diverse communities that we serve

Schools That Fit



When you build a thing you cannot merely build that thing in isolation, but must also repair the world around it, and within it, so that the larger world at that one place becomes more coherent, and more whole; and the thing which you make takes its place in the web of nature, as you make it.

Christopher Alexander
A Pattern Language

Momentum is growing for a new type of school design. Research consistently supports the superior performance of schools that are quite different from the model of the last century: corridors lined with uniform "cells," rows of rooms 30 feet by 30 feet, each the domain of a single teacher who addresses a new group of students each hour until the sound of a bell sends students off in a tangle to another teacher in another identical room for another hour. And on and on.

Research suggests better configurations—and better ways of learning. The arrangement of rooms is being questioned. The size of rooms is being questioned. The uniformity of the rooms. The purpose of the rooms. The role of the teacher. The length of the class period. The movement of students. All are being questioned. Even the ideal size of a school is being challenged. Where high schools were once designed to contain 1,000, 2,000, 3,000 students and more—economies of scale for the production of uniform widgets—the new ideal school may be no larger than 600 students.

Designing—and using—this new school will be one of the greatest challenges of coming years for school superintendents, school boards and architects alike. For teachers, parents and politicians as well.

With more than 20 years of experience designing schools, we have been present at the creation of many schools. We have been asked to fix problems or make improvements in many more. We have been both first-guessers and second-guessers. With that accumulation of experience, we have what we believe are some useful suggestions.

The Challenge: Beyond Design

We recently asked Joe Nathan, a leading advocate for smaller schools and schools that share facilities with other institutions, what he would do if he were an architect. He cited the work of Ted Bryk and others, which demonstrated that large schools actually deliver "diseconomies of scale." "The problem," said Nathan, "is that people don't want to see that evidence. If I were an architect, I would encourage people to see it differently."

There's the rub for us and for other concerned architects. We are architects not educators, yet the challenge put to us is not simply to design better schools, but to convince people that better schools—different schools—are desirable.

Our goal in designing schools is not simply to please ourselves with brilliant designs or to memorialize those who commission our work. We are striving to help schools succeed. But, in doing so we walk a tightrope.

To maintain our balance and achieve our goal, we are compelled to understand the theory and practice of education and the research and experience that inform them—the "evidence" to which Nathan refers. To create facilities that are successful, we have no choice but to understand the programs that will reside there and the rationales behind them.

But we also have quite another obligation: to design schools that work for the children, parents, administrators, teachers and communities where they are built. We strive to design schools that help communities achieve success by their standards, not ours.

The Solution: Align Facilities with Programs

Education will be most effective when it is vital to the lives of learners, when it helps them make connections between learning and living, when it compels them to ask questions and seek answers. Each community, perhaps each family, will take a different view of that vitality and those connections.

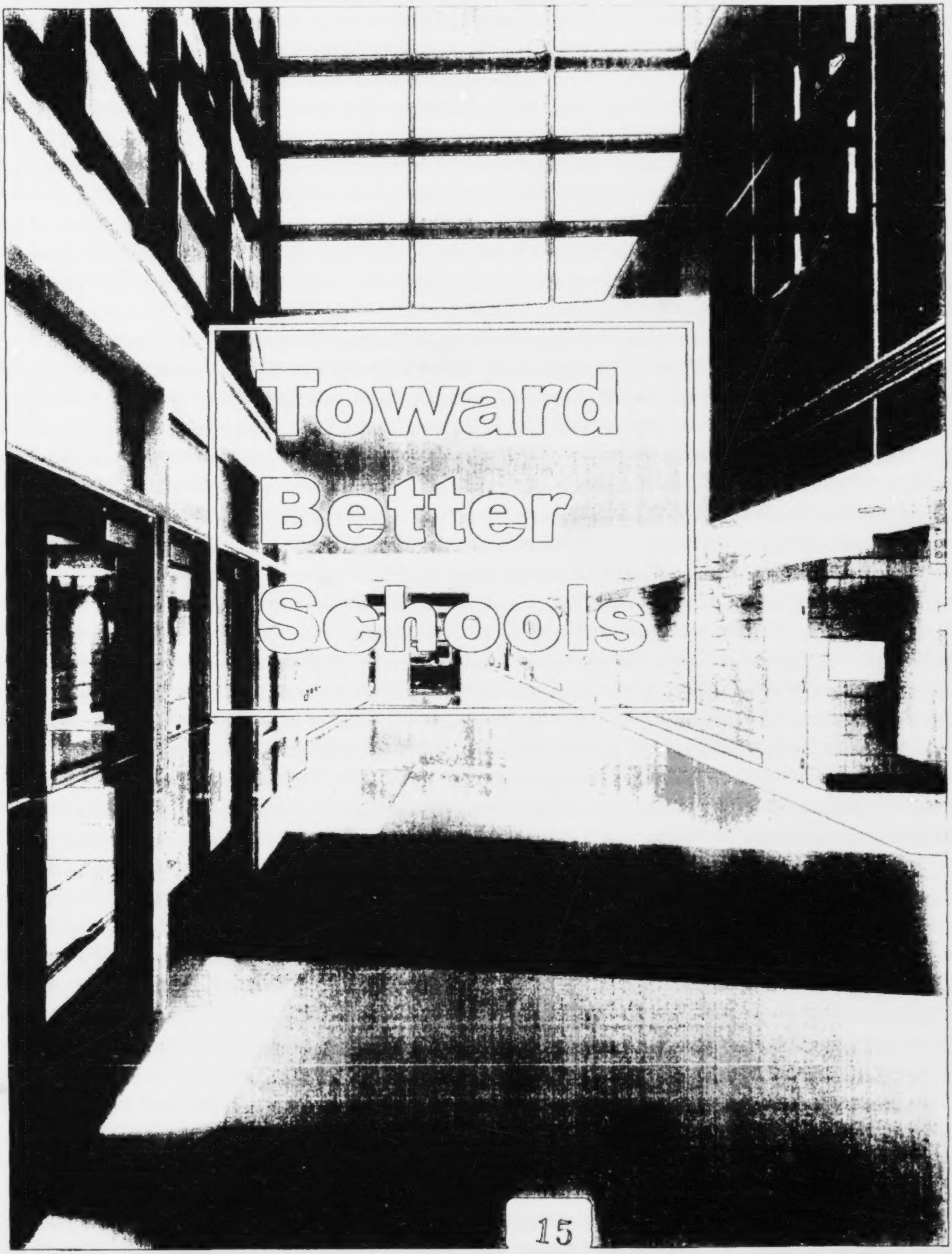
Consequently, for us to design schools that make a positive and powerful contribution to education and individual learners, we must understand not only what research tells us about successful education, we must also understand how communities and local educators respond to that research. We must determine how facilities can be integral parts of the educational visions of unique communities.

As architects, we don't have the power to improve education. Only those who use our designs, those who learn in them, teach in them and operate them have the power to make schools succeed. No building will determine whether students learn. However, facilities can and should make a significant contribution to the success of programs.

The greatest challenge for a school architect, therefore, is to align the facility with programs. Facilities can reinforce mission at every turn or they can cause frustration. The alignment of facilities with programs must be clear and thorough.

That's not so simple. Communities are often not so sure what their educational program should be. Disputes arise. Agendas clash. Divergent views often prohibit solutions that wander very far from what's been done before. Change is incremental, and often marginal. The students, parents, teachers and administrators who determine the direction of an educational program determine also what an architect can do—or should do.

Our obligation as architects is to give communities not one ideal blueprint for a school that will be identical here, there or anywhere, but rather a school that fits—uniquely fits—their vision, their community, their teachers, their administrators, their learners, and their children.



Toward Better Schools

Education ain't what it used to be ...
and it never was.

Will Rogers

Change is slow, building schools is slower. The average age of public schools in the United States is 42 years according to the American Institute of Architects, which further estimates that one in three schools is in serious disrepair or suffering from extreme overcrowding.

But perhaps now is the time to accelerate change—at least in how we think of schools. Spending on new school construction in the United States from 2000-2003 is expected to surpass $100 billion. In May 2001, the AIA estimated that $200 billion is needed for school infrastructure improvements nationally. Such sums suggest the dire condition of America's schools, but they also underscore an opportunity. If a new type of school is needed, if a new direction is called for, now is the time for districts to make those important decisions before more billions in spending lock us into the structures of our past rather than our future.

The need to make those expenditures to improve education and upgrade our schools comes at a time of increased debate about education. Perhaps not since the late 1950s has the national debate over education been more at center stage. Charter schools, choice schools and school vouchers have been at the core of a discussion on how we educate our children and a growing discontent with our public schools.

The popularity of alternatives to mainstream public schools has been driven in part by a rejection of the large, often impersonal schools that have been the norm. Students are pursuing alternatives at an increasing pace. Joe Nathan points out that in 1990, 4,000 Minnesota students attended alternative learning centers. By 2000 that number had grown to 120,000. "Students are choosing not to go to large high schools," he says.

Smaller Is Better

The case for smaller schools has been convincingly made by many people looking at education from many angles. Mary Anne Raywid states that the superiority of smaller schools over large has been established "with a clarity and confidence rare in the annals of education."

The organizational benefits claimed for smaller schools are not so surprising in a larger context. Businesses have tended to move in the same direction—as have many government agencies—in an effort to move products and programs closer to customers. The business world has for the most part recognized the superior performance of smaller, decentralized, locally controlled organizations that respond more nimbly to markets, customers, technologies and competitors. Smaller business units have also been found to provide greater employee satisfaction as individuals acquire a greater stake in the performance of their units.

Abundant research to support smaller schools has been cited and summarized in many publications in recent years. We will not repeat the detail they provide. (A partial listing of research compilations is provided at the conclusion of this document.)

To summarize that research broadly, smaller schools have been demonstrated to deliver improvements in student achievement, student behavior, and teacher performance and satisfaction. These improvements have been found consistently in urban, suburban and rural schools.

- Student achievement. Smaller schools create more intimate learning environments where each student is well known and can be guided and coached individually by teachers. Specifically, research demonstrates that students in small schools improve grades, test scores, attendance and graduation rates. This is a benefit that smaller schools confer more effectively than simply smaller classes. Smaller schools also reduce the effect of poverty on achievement. The correlation between poverty and low achievement is several times stronger for larger schools than smaller schools. Even in affluent communities achievement appears to be at least equal in smaller schools, although the gains are less pronounced.

- Student behavior. Smaller schools reduce the isolation and alienation that often breed discipline problems and violence – from truancy and substance abuse to vandalism and gang participation. But the benefits go beyond eliminating a negative. Students in small schools also have increased positive feelings toward others and themselves. They belong to something identifiable; they feel connected to other students, teachers and the school community. Moreover, a higher percentage of students participate in extracurricular activities, which further increases their connections with each other and the school.

- Teacher performance and satisfaction. Smaller schools encourage teachers to become more involved in their students' success. They know their students better and have a greater stake in the individual performance of students. Staff members tend to serve multiple roles and participate more fully in decision making, working together to build a quality curriculum across disciplines and grades. Small faculties are also more likely to pursue professional development that will help meet instructional goals. Teachers in smaller schools find greater satisfaction in their work, which has resulted in lower turnover.

Such an array of benefits is precisely why the move to smaller schools is gaining momentum. What better measures can there be of a school's performance?

Small Is Not the Only Frontier

As convincing as research is on school size, it is clearly not the sole determinant of schools' success. "Small" does not stand alone on the frontier of improved programs and, therefore, facilities. While school size has proven to be a very significant factor in school performance, other issues also merit consideration – and compound the challenge for communities as they consider how to improve schools.

Turning Points 2000, a report on middle school reform sponsored by the Carnegie Corporation of New York, states the challenge succinctly. Changes in school organizational structure, write the authors, "are necessary but not sufficient for major improvement in academic performance. These structural changes must be accompanied by substantial improvement in teaching and learning."

Views of learning itself have changed markedly since most existing schools were constructed. Receding fast is the notion that lecturing and note-taking, supplemented by reading, are sufficient means of communicating or acquiring knowledge. Information does not guarantee learning.

Not all students learn the same way. Brain-based learning suggests that all of us process and learn information differently. Some by hearing, some by seeing, some by touching, some by feeling, some by experiencing. How do learners learn best? All of these ways, and perhaps especially when learning takes precedence over teaching. How do we make learning relevant? Learners have to make connections between information and knowledge. They need interdisciplinary learning. They need hands-on experiences. They need cooperative learning. They need multiple learning pathways, any of which, or all in combination, may lead to the little discoveries, those "eureka!" moments, that have the power to alter the course of their lives.

All the different ways we learn have not been reflected in most traditional school buildings. Learners need more places and more ways to learn than are afforded by traditional classrooms and the one or two science labs that have existed in most schools. They need places and spaces in which learning increases, and so does the relevance of that learning, a fundamental improvement in education that must occur if we are to stem the tide of dropouts, kids who find school so far removed from their world that they quit, literally or figuratively, with powerful and almost certain consequences for the rest of their lives.

While it is clear that new learning models can co-exist with smaller schools and are often aided by smaller learning environments, the challenge for school districts is to establish priorities among these possibilities. Although they create often complementary agendas, organizational structure and learning methods compete in many cases for emphasis as communities grapple with the task of providing the best schools they can.

Applying the Lessons: Schools That Fit

Take all the research, all the opinions and all the debates together and what begins as a national imperative to improve education boils down to a community's vision for its schools. The debate over educational programs and facilities at the local level often is reduced to a handful of the most active and concerned educators and parents determining the fate of those collective billions in school spending. We're back to schools that fit—which in practice often means finding middle ground among those who would change everything and those who would change nothing.

Even a report that recommends sweeping reform in schools recognizes the necessity of that fit. In Turning Points 2000, Anthony Jackson and Gayle Davis write,

> Schools are not blank slates on which this design or any other can be drawn without restriction or concern for the unique nature and status of the school itself. The Turning Points 2000 design, like instruction for students, should meet schools where they are and help take them where they need to go to ensure success.

The range of choices for improving schools is broad even if it does not encompass building new small schools. Indeed, there is a lot of middle ground between the extremes of many of today's schools and the ideal smaller learning environment that research recommends.

Schools can be built to incorporate learning environments and spaces quite different from the conventional classrooms of the past, even in larger schools. Space can be designed in such a way that it provides the advantages of intimacy and identity within larger schools. Schools can be made to "feel" smaller, or organized into smaller units even without the administrative autonomy that some educators claim to be one of the great advantages of smaller schools. In some districts these improvements are being implemented to improve programs across the board even while new construction is devoted to smaller schools.

Many communities are paying close attention to research on school size, as well as how children learn, and are incorporating what makes sense to them. That does not necessarily mean that they are building small schools—but they are applying many lessons learned from successful small schools. Proponents of smaller schools may find these partial measures insufficient, particularly when the facilities being built at the core of those programs will be expected to last decades.

What we find encouraging in working with communities across the country, however, is that many of them are seriously considering dramatic changes in education. Although each community considers different organizational structures or learning methods, and designs and builds quite different schools, what most have in common is that they are not building the schools of the past.

What is most striking from the research and from our experience is that schools are changing. We think for the better. How much will they continue to change? We think change will accelerate and we are encouraged by that. But significant obstacles remain. Foremost among them is the ability of larger school districts to adapt research on smaller schools and learning methods to meet their needs and capacities.

So many of the lessons of smaller schools have been learned by small groups of parents or teachers who tried to find a better way. In many of the examples cited in the literature, a few dedicated individuals pushed for change and personally supervised successful implementation. They were hands-on parents, teachers and administrators working on a small enough level to change schools personally, almost by force of will. Small school advocates would argue that all parents, teachers and administrators should have that same power—a power that smaller schools already give them.

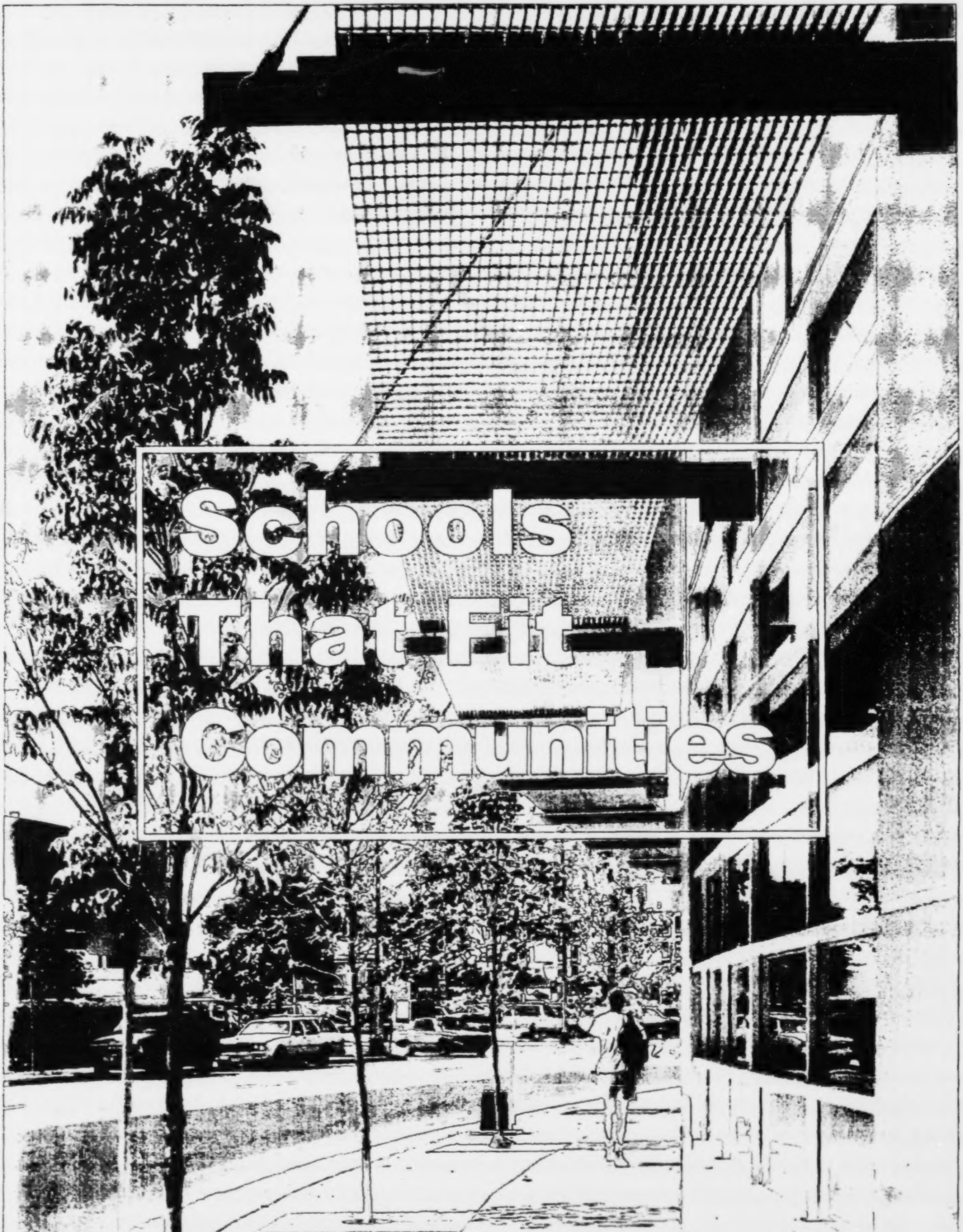
The task of translating those successes on a larger scale, however, is enormous. What we are asking of school leaders and communities is that they take what has often been a grassroots movement and manage it. The contradiction is apparent. Can a bottom-up design process be mandated from the top down? Probably not. Can it be led? Certainly—as we have found in our work with several school districts where significant changes in learning and building are being implemented. We have worked with other districts that have collaborated in new ways to create innovative individual schools.

Notable districts around the country have undertaken comprehensive revisions of education programs and facilities, but few can detail successes over an adequate period of time to prove how it should be done. We are left to draw on our experience and the growing number of examples in education literature for guidance on how to proceed.

What we have learned is that for innovations in education to be given serious consideration, programs and facilities must fit local circumstances on several key levels.

- They must fit communities, meeting each one's unique goals and identity.
- They must fit school leaders, working within the vision and capability of school boards, superintendents, principals and their staffs to lead the planning, design and operation of schools that are sometimes radically different from those they are accustomed to.
- They must fit teachers, giving them the resources and facilities to do their jobs as best they can.
- They must fit learners, providing facilities that enable them to learn in the ways that resonate with them.
- They must fit children, satisfying their needs for security, comfort and stimulation.

The goal of aligning architecture with education, facilities with programs, is to improve education for learners. Yet we address here the fit with communities, school leaders and teachers first for good reason: they are the filters through which improvements in education are viewed and the lessons of research are interpreted. If the success of students were the only factor in designing schools, all school designs would be determined solely by research and experience on how students learn best. As we point out, however, many other factors and opinions come into play.



Schools That Fit Communities

The only true voyage of discovery consists not o
visiting new places, but seeing with new eyes.

Voltaire

Each school district and school has its own personality. That is a starting point, reinforced repeatedly by experience, for designing facilities aligned with programs that fit a community.

To identify that personality and give it expression in school design, we have found it essential to engage the community thoroughly in the design process. What that process produces is often different than anyone imagines when it begins.

Bloomington, Minnesota didn't anticipate a vast reorganization when the district began a process of examining its educational objectives. But they ended up with a thorough revision of school structure that touched every school in the district. Voters in the district approved a $107 million school referendum in 1998 to pay for those changes, the largest ever passed in the state at that time.

Round Rock, Texas planned to build one new school, but as the community was engaged in trying to determine the shape that school would take, the community reexamined its entire educational vision. They found that they could not separate one new school from the mission of all schools in the district.

If a community learns a good deal about itself in the process of examining its schools and educational objectives, we as architects who often act as facilitators or moderators of that process have to be very cautious in what we expect it to produce.

We have come to rely upon our Vision-Based Planning process that helps us understand community objectives and develop agreement on facilities that fit programs. First used in 1971 to gather community input on a school planned for an inner-city neighborhood in Minneapolis with a large Native American population, we have continued to refine the process to adapt it to a wide variety of projects and school districts.

By beginning the process at the broadest level in terms of educational vision, we open the possibilities for incorporating new thinking, new programs and new facilities as we move deeper into the details.

Vision-Based Planning

We have been engaged at various stages of school projects, at times acting as facilitators from the beginning, other times becoming involved after broad vision and objectives for a district or a school have been defined. In every case however, we apply our Vision-Based Planning process to ensure that we understand the educational objectives and programs in order to design spaces that fit.

In designing schools that fit, three issues consistently come to the fore, including a community's:

- educational vision and objectives
- identity and culture
- ability or willingness to pay for school improvements, whether in the form of new facilities or changes to existing facilities.

Educational Vision and Objectives

Clearly, if we are to build schools that fit a community, we must understand the vision and objectives of the community. The process of identifying that vision is very similar whether a district is examining a specific, identified need—a single new school—or reexamining its educational objectives district-wide.

Focus on vision and objectives serves two important purposes. First, that focus identifies what the community truly wants of its schools, so that schools reflect the community and enjoy public commitment to whatever schools emerge from the process. The commitment of administrators, teachers and parents is, in our experience and the literature, one of the greatest factors in the success of schools. Further, the process engages the community and, if consensus is nurtured, broadens the base of participation and support—essential if public approval of spending is required.

Second, starting with a vision and objectives opens the door to considerations of what is possible and how others have succeeded. It creates greater openness to non-traditional programs and facilities and to the research that supports them, from organizational structure and learning methods to the school's place at the center of a community of learners. A community is less likely to become locked into a particular type or size of building if initial discussions revolve around what the community wants from education—for school age children and others—if programs shape facilities.

Using our planning approach, we have addressed vision and objectives in the design process for a wide variety of projects ranging from one new school, to renovation of schools across a district to new schools that were the result of multi-district collaborations.

A School

Crossroads Elementary was the first new elementary school built in St. Paul in 25 years. We worked with a Building Committee selected by the school district to design a school for 880 pre-kindergarten through 6th grade students. Staff, parents and community representatives participated in a series of planning meetings to reach consensus on context, expectations, educational vision, learning results, and educational delivery. The result of this planning process is a school that features two hands-on, project-based programs: a Montessori program and a science program. Each program has its own house linked by a central, two-story Inquiry Zone (I-Zone) where children learn to make connections between theory and practice. The school also includes facilities designed specifically for an Early Childhood Family Education (ECEF) program as well as an Early Childhood Special Education (ECSE) program.

A District

Bloomington, Minnesota schools have a very clear charge, which is posted on the walls of the district's administrative offices: Renovate, Reorganize, Redesign. The process that led to that sweeping assignment began in 1997 when the district created three action teams to examine the district's facilities, demographics and middle school grade structure.

"We told the teams, 'Give us your best recommendation, others will worry about how it gets done,'" says superintendent Dr. Gary Prest. He adds that the process, which eventually included 16 transition teams, did not produce a single recommendation that the school district's administration couldn't accept.

The results of that process underscore the importance of an integrated process, according to Prest. "Everything is interconnected," he says. The middle school group came to the conclusion that a new grade structure was required, changing from two middle schools, one for grades 5-6, another for grades 7-8, to three middle schools, each housing grades 6-8. Of course, that recommendation meant keeping 5th graders in elementary school and creating a third middle school. The changes eventually resulted in reassigning one-third of the district's teachers. Our work with the action teams and stakeholders at all of the district's 17 buildings resulted in a Facility Master Plan that continues to be implemented.

A broad-scale planning process emerged from our initial participation in an RFP for a new high school in Round Rock, Texas. As we discussed with the community its vision for the school, they realized that the changes they envisioned for one new school required them to reassess their vision on a larger scale for all schools in the district. That process continues as we write this report.

A Region

At times the vision and objectives of a community extend across school-district boundaries. Cooperation across school districts has been the logical result of the recognition that education problems and their solutions may require broader vision. Cities and suburbs, for instance, often find considerable common ground in their efforts to enrich education—and are often partners in attempting to integrate schools. We have participated in two such interdistrict collaborations that resulted in school programs and facilities quite unlike others in any of the districts.

Crosswinds Arts and Science Middle School Crosswinds is the result of seven districts, St. Paul and suburbs, working together to build a new kind of school that none of the districts alone was prepared to build. It is a middle school with an arts and science emphasis built adjacent to a park in Woodbury, Minn. It was planned to operate year-round and attract 600 students grades 6-8 from all districts. The school features multi-age learning houses with "home bases" designed for 100 students each of mixed grade levels. There are no classrooms. Instead, each home base includes individual student workstations, resource areas where small groups can meet, and a larger gathering and performance area. The home bases open on to a larger central area, the "heart" of the school, which contains an all-school performance area and social hall.

Pre-design meetings of educators, parents and community members focused on defining a vision for the school in terms of learning context, outcomes, process, organization, partnerships and staff. Technology and the environment were other important factors discussed. Based on these discussions and the consensus achieved on critical issues, we created "filters" that would guide us in all subsequent decisions. Of particular importance were discussions about how middle school students learn. The result of that focus on the learning process is an environment where disciplines are interconnected in hands-on, project-based learning that includes the development of presentation and description skills.

The Interdistrict Downtown School (IDDS) A similar process produced a far different building in downtown Minneapolis. Built over an underground parking ramp in downtown Minneapolis, this state-funded K-12 school resulted from a collaboration between Minneapolis and eight (now nine) suburban school districts. Designed to accommodate 500-600 students, IDDS is unique in programs and facilities. As Crosswinds was planned to fit into its parkland environment, so IDDS was designed to fit into and complement its urban setting of theaters and office buildings.

With a multitude of resources nearby – business, government, a university and several performing arts centers – the school is intended to provide experiential learning for older students in these external labs. The school itself is also a lab of sorts. Much of the internal construction and infrastructure of the building is exposed, leading to a natural study of methods and systems, and stimulating the curiosity of students.

The planning process also led to an environmental focus in designing the school. Resource efficiency, air quality, natural systems and lighting all received special attention given that focus. From a Solar Wall that provides heat to careful location of windows to provide maximum daylight, to finishes that help maintain air quality, the school was designed to be a green, living school.

In what was designed from the start as a small school, the three upper stories are divided into two houses each, in which students from mixed grade levels learn together in even smaller environments.

"As a way to run a school, we're probably not a model," says Lee Fertig, director of IDDS, "because it's unlikely that this many districts will ever collaborate on a school." Yet, IDDS represents how districts can target common needs and arrive at solutions beyond the limits of traditional thinking – in programs and facilities.

These are just a few examples of how communities prioritized programs and the quite different facilities that resulted. In each case, we used our Vision-Based Planning process, yet the resulting schools were unique. Each school fit that community's educational vision and objectives.

Identity and Culture

A second consideration when trying to "fit" a school to a community is that community's unique identity and culture. School administrators and architects alike have been accused of having "edifice complexes," the desire to build imposing structures as monuments to themselves or proof of their prowess. It is as serious an indictment as could be made of either educators or architects. Yet, the fact remains that school buildings, at their best, physically represent more than an agglomeration of spaces where children learn.

As expressions of one of the most important communal endeavors, school buildings are symbols and landmarks. They can and should be a source of pride and a symbol of the community, as well as a center of the community. That can be accomplished without sacrificing educational objectives and it can be done equally effectively in schools of any size. Proponents of smaller schools would argue that improvements can be made in education without waiting for shiny new facilities. We agree wholeheartedly. But when a commitment is made to new or remodeled facilities, identity and culture should be reflected in those designs.

A school that reflects a community's identity and culture goes part way to achieving one of the objectives of smaller schools, which is to make the school a more integral part of a community and the lives of its students, and to give the school an identity that they can point to with pride and a sense of ownership.

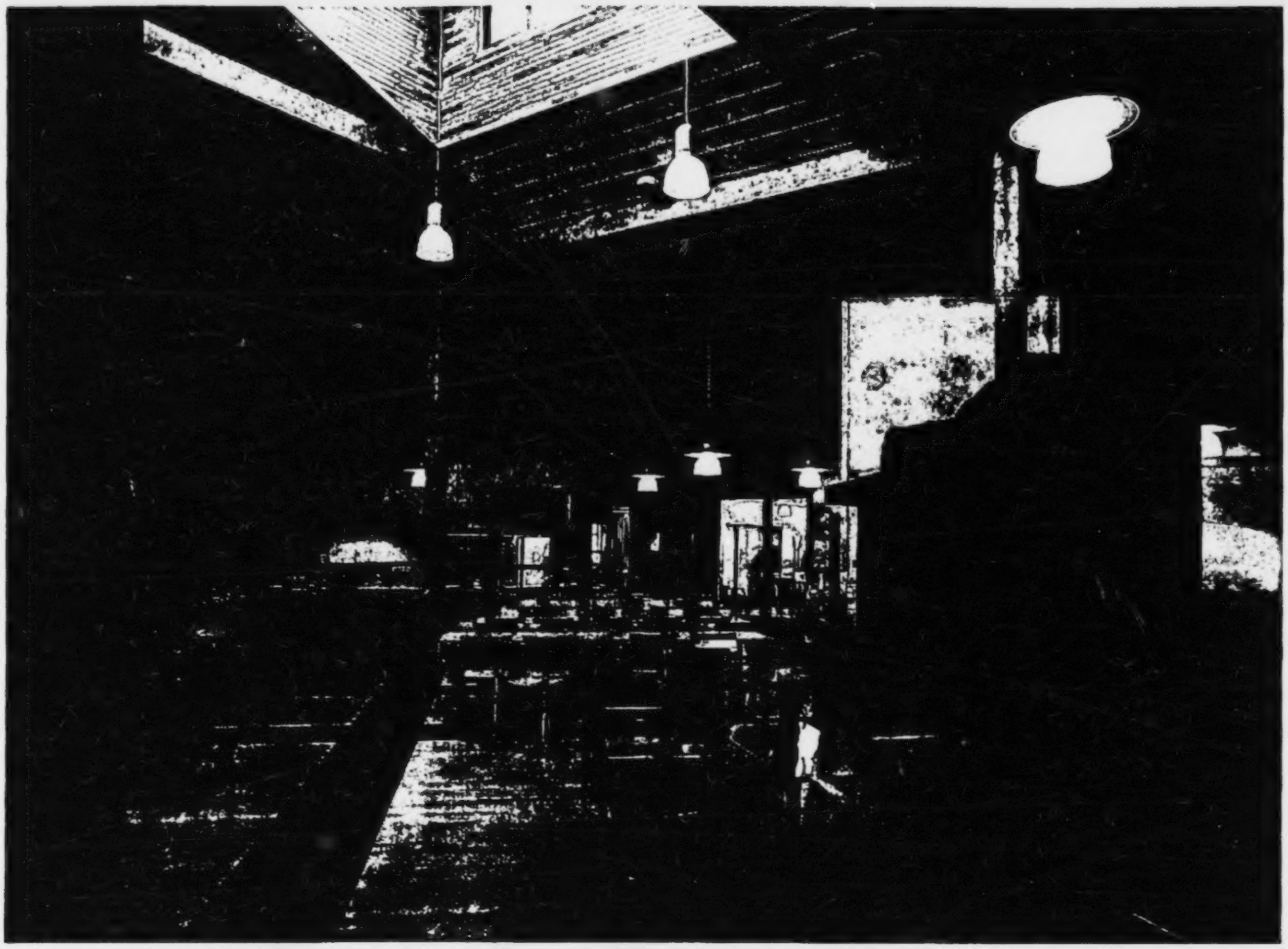
Identity and culture can, however, also make changing schools more difficult. School size may be determined in part by the extent to which a community's identity revolves around a school—especially in communities that have always had one high school. Community events are often scheduled around high school activities, which serve as a unifying force in a town. The problem is compounded when an identity is connected to extracurricular activities, especially sports. Maintaining sufficient enrollment to be able to field a championship-caliber football team has been cited as a significant driver in determining school size in some communities.

Proponents of smaller schools maintain that smaller schools offer a different advantage: a higher percentage of students participate in extracurricular activities in smaller schools. That participation is an important factor, they say, in creating a well-rounded school experience and creating a bond between students and their schools. Should team athletic success be a factor in establishing educational programs? Ideally, no. Will it play a role in discussions of school size, especially in communities that do not already have several high schools? Almost certainly. Public sentiment on that count cannot be ignored.

Incorporating a community's identity into schools to achieve a good fit can be accomplished subtly or boldly, depending on the community. At times that expression of identity seems obvious, at others less so.

Progressive, But Not Pretentious

As part of a renovation plan in Bloomington, Media Centers were added to identical elementary schools. How those centers were incorporated into the schools was left to a separate committee at each school—with quite different results. The committee in a more affluent neighborhood chose a lower visibility addition. The school in a less affluent neighborhood wanted the addition to be highly visible, a statement that the school was modern and progressive. Both schools now believe that their Media Center is better—although in their essentials they are identical.

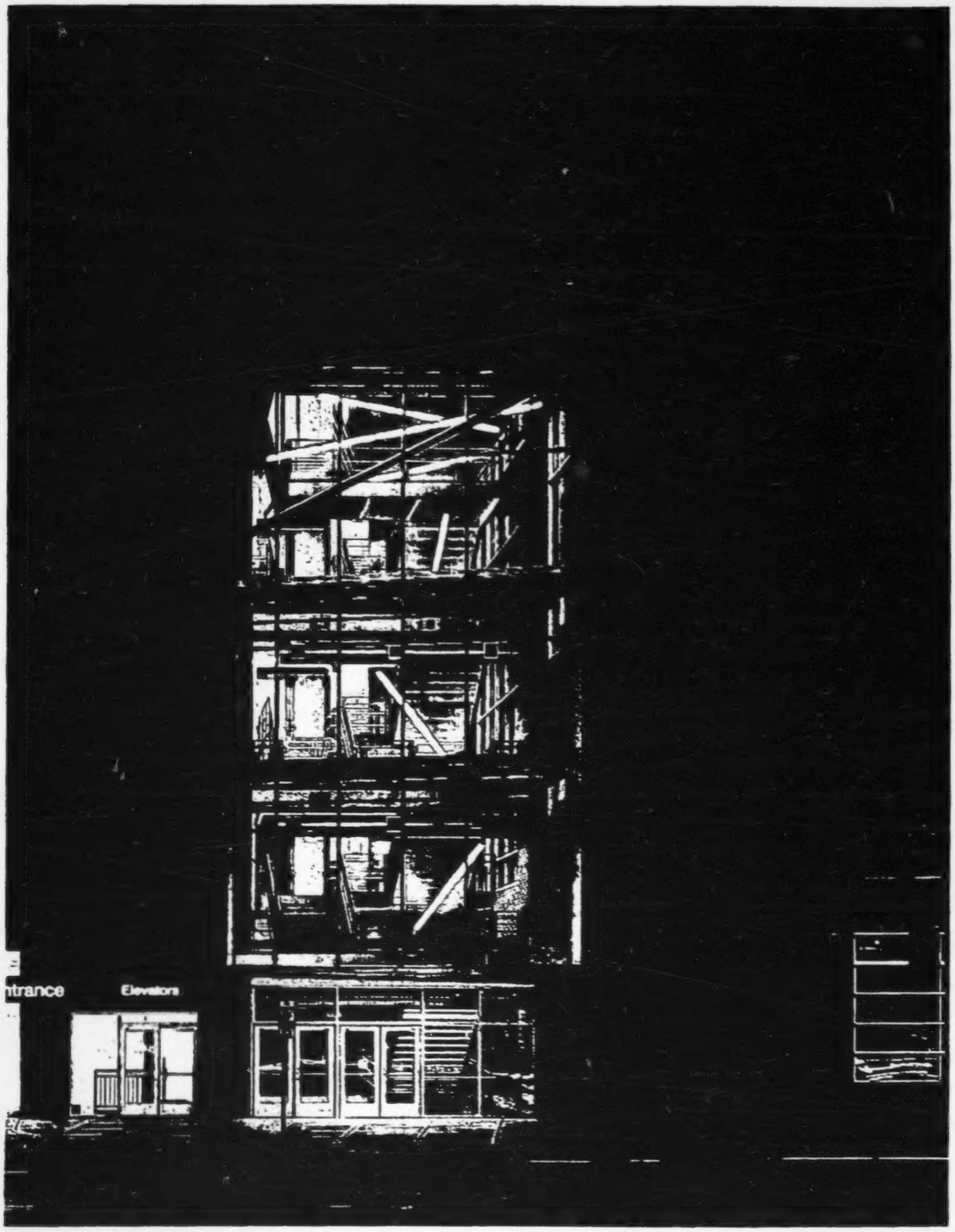


Of Lumber, Loaves and Learning

A new elementary school in Heinävaara, Finland posed unique challenges, perhaps the greatest of which was overcoming reluctance by some in the community to work with architects from overseas. A Vision-Based Planning approach to the project succeeded in gaining the trust of the community, which was relieved to find that the American architects would not impose American concepts.

Heinävaara wanted a school framed of wood, timber being one of the great resources of the region. They wanted the school built using platform framing techniques not traditionally used in the region. The local technical college put up bleachers next to the construction site so students could watch and learn the technique. Five American carpenters, two of whom spoke Finnish, demonstrated the process as the school was built.

Not only construction methods were unique, however. The school was designed with open classrooms facing onto a central area that could be used for larger group activities, providing a variety of learning spaces. A large Karelian oven, used to bake local bread, was placed in that common area. It is used often, sending the smell of baking bread wafting through the school. At one end of the central open space is a stage for school presentations. The back of the stage faces the school cafeteria, where larger audiences can be seated for community events and performances. The design and construction of the school met unique community needs: it used local resources, taught a new construction technique, provided flexible learning spaces, incorporated local food preparation customs (what could make a young child feel more secure and comfortable in school than the smell of baking bread?) and allowed for multiple community uses. The school entrance also draws on a classic Karelian design and features a typically Karelian roof.



Bright Lights, Big City

A 500-student K-12 school built in downtown Minneapolis is the result of cooperation among 9 metropolitan districts. The school's identity is uniquely that of a downtown school, the only one in the center of this city. To make that identity clear and make the school a part of downtown, the main staircase faces the street and is open to the street and nearby theater marquees through a three-story, cantilevered window. The view is of the city, because the school is of the city. The facade uniquely reinforces the identity of the place and the students who learn there. Moreover the school is connected to the rest of downtown through skyways. Its location and connections stress that it is an integral part of a vibrant community.

Ceremonial Space

A new (7-12) upper school for the Mille Lacs band of Ojibwe presented a different identity challenge. The school was intended to be an integral and important part of the community and represent the traditions and culture of the community. A central room was designed that served as a place for traditional pipe ceremonies. It has become a gathering place for the community.

How Do You Skin a Seal?

Similar challenges arose in the remodeling of the school in Kotzebue, Alaska, a community that is inhabited primarily by Inupiat people. In redesigning the school, the community wanted a room for elders to visit children and to make presentations on the ways of village life. Our initial thought was to locate that room in the interior of the school, leaving rooms along the exterior walls that received natural light (what little there is in midwinter) for classrooms. Then we learned that the community room would be used for, among other things, seal-skinning demonstrations. To avoid having seals hauled through the corridors of the school, it made more practical sense to locate that room near the door, using one of the rooms with coveted exterior windows.

Do any of these design elements make for better education? Perhaps not directly. But a child's comfort in her surroundings, her sense of identity and belonging, her sense of being connected to a community all can play a supporting role in breaking down barriers to learning. They also help break down barriers between community and school.

Ability or Willingness to Pay

The third issue that determines the fit of school programs and facilities in a community is cost – or more precisely the community's ability or willingness to pay for improvements.

Cost is always an issue, but it arises particularly when a district considers a shift to smaller schools. The immediate concern is that more, smaller facilities lead to higher building and operating costs. The notion that economies of scale exist in education dies hard – even though the business world has shifted thinking on that score, moving away from top-down management and assembly-line production toward more decentralized independent units.

Those who raise economy of scale issues, however, often use what has proven to be an incomplete measure of operating cost: annual cost per pupil. Proponents of smaller schools have countered by suggesting different measures of cost. Research has found that while smaller schools may be more expensive to operate on a per pupil basis, they are less expensive to operate when measured by cost per graduate. More kids stay in school and complete their high school education.

Other studies have found that some operating costs are reduced in smaller schools. For instance, not as many people and less time is required to maintain school security and discipline among students in smaller schools. Lee Fertig, director of the IDDS K-12 school in downtown Minneapolis, suggests other administrative advantages of smaller schools. One example, he said, is that checking attendance is so much easier and less time-consuming in a small school. Someone in his office needs only fifteen minutes to check attendance, where in large schools he says that process consumes vastly more time. As a result, attendance problems can be identified easily and addressed quickly.

Transportation costs may also be lower for smaller schools. Because smaller schools may serve a smaller geographic area, more students live within walking distance of school. That fact contributed to the decision by Bloomington schools to operate their own buses—a step made feasible as the district changed grade structure and went from two middle schools to three. Moreover, studies have shown that teacher turnover is lower in smaller schools, which reduces hiring costs.

The cost of education is a thorny issue in all communities whether or not they are considering new programs or facilities, and regardless of school size. As some pundits have noted, "Politics is school funding." In our experience, the more complete and inclusive the planning process, the more likely that communities will accept the costs of achieving the community's educational goals. A broad-based consensus on educational vision is the foundation on which successful referendum planning is built.

No other models exist for resolving cost issues in the school planning process and none is likely to emerge, because each community faces unique challenges. We would suggest, however, two additional means of addressing cost:

- Partnerships between schools and other community agencies can help defray costs.
- Facilities designed for flexibility can accommodate change in the future.

Shared Needs, Shared Space

Partnering with other community agencies makes schools more affordable. Because so many successful smaller schools were developed in conjunction with other community programs or combined with them, the movement to smaller schools and schools that partner with other organizations have become closely linked (see Joe Nathan's *Smaller, Safer, Saner Successful Schools.*) Communities can reduce the cost of building schools if those schools meet multiple community needs or if they do not include redundant facilities.

Schools are sharing recreation facilities, meeting spaces, even libraries with communities in an effort to lower the cost of educational facilities and enhance their value to the community. We have participated in the planning and design of several school facilities that share space with the community.

- Round-the-Clock Recreation. Hopkins Schools and the City of Minnetonka constructed a new 92,000-square-foot athletic center that serves the school and the community.

- Pooled Resources. Oak Point Elementary School in Eden Prairie includes a swimming pool shared by the school and community. Many areas of the school can be accessed after school hours for community education and lifelong learning.
- Y's Move. The IDDS in Minneapolis was built without a gymnasium. Students use the facilities of a new YMCA two blocks away, reached through enclosed public skyways.
- Partnership for Parenting. Crossroads Elementary School includes space designed specifically for Early Childhood Family Education (ECFE) and Early Childhood Special Education (ECSE) programs. These programs provide parenting classes while children receive supervised care.

Future Costs

The cost of any facility can be reduced over time if it can accommodate change, extending its effective life. Future renovation cost is an important design consideration for architects of schools, perhaps more than most other types of structures. Flexible, growable and durable spaces can be reconfigured or adapted to innovative programs that make education more and more effective. That flexibility extends from layout of space and infrastructure to construction methods. For instance, expensive moveable walls may not be necessary when it is probably cheaper to build walls with studs and sheetrock—and knock them down and reconfigure them if space needs change.

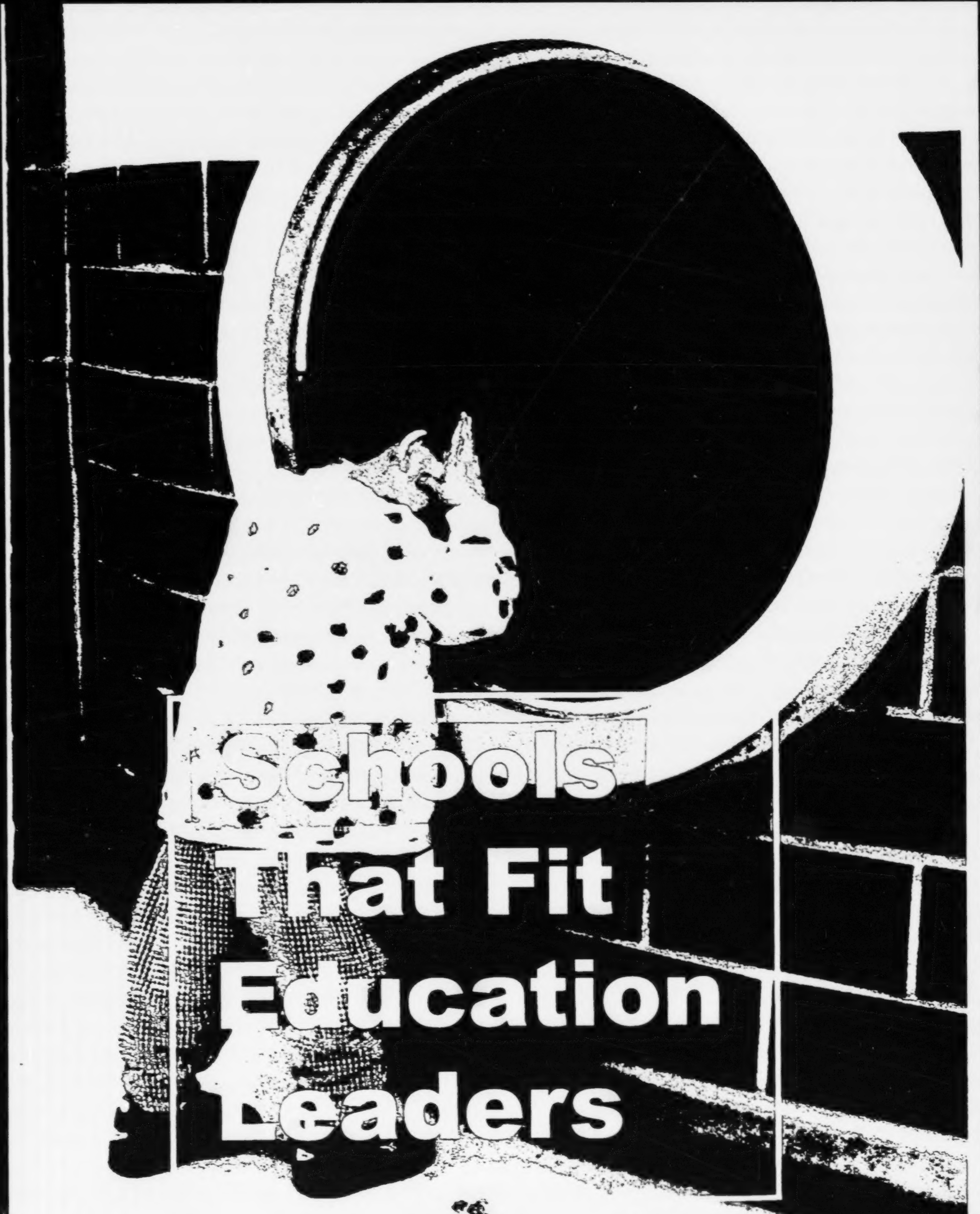
Additional cost savings, in dollars and resources, may be achieved by careful consideration of environmental issues. IDDS and the Breck School fieldhouse feature Solar Walls that warm air before it is brought into the building to augment heating. At IDDS the solar wall has provided estimated savings of $4,700 a month on heating costs. Both facilities are also capable of operating fully on daylight for much of the year.

Cost is not the only issue to consider when addressing environmental factors. What is the value of reducing pollution and waste, of using resources more efficiently and of protecting air quality? The cost of not considering those issues is difficult to measure, but in our experience those factors have become more important to parents and educators when building schools.

Where the School Takes Shape

Designing schools that fit communities begins in discussions by the community, where individuals can express their goals and preferences—and can reach some consensus on education. In that process, it is our job to listen, then question and clarify what we hear, whether we are observers or facilitators of that process. The opinions expressed are many, diverse and at times unpredictable—but usually lead to an educational vision that reflects a distinctive identity.

In most cases, however, the community does not initiate the process; rather, it responds to an opportunity to express its views. The process of examining what the community wants usually starts with school leaders—and depends on them for direction.



Schools That Fit Education Leaders

A teacher affects eternity; he can never tell where his influence stops.

Henry Brooks Adams

How do we design and build schools that fit school leaders? That's a bit like saying we'll make a suit to fit the tailor. School superintendents are the drivers of change in most districts. School programs and facilities usually reflect a superintendent's vision and agenda—within the constraints of public sentiment and appetite for change. Those constraints can be considerable, however, especially when considering smaller schools.

Despite the overwhelming evidence in support of smaller schools, many communities are not building them. Education experts and school leaders have largely accepted the results of small school research, but parents and teachers are not as convinced or at least place a lower priority on school size.

Surveys conducted by Public Agenda reveal that parents and teachers do not think school size is a significant factor in school or student performance. More than half of parents (55%) in the survey who had a choice where their children attended school said that school size was not an important factor in their decision. Among teachers, 70% placed a greater priority on reducing class size than reducing total school enrollment. A majority of both parents and teachers said that as long as the school is not overcrowded, it doesn't matter how many students attend a school.

One large suburban school district commissioned a summary of research on school size, among other issues, for presentation to the committees considering school plans. After the presentation, when asked for their reactions, a couple people responded similarly, "The research doesn't apply to us."

Jean Johnson, senior vice president of Public Agenda, writes in the January 2002 issue of Phi Delta Kappan,

> Although parents and teachers are receptive to the idea of smaller schools, such receptivity does not automatically and spontaneously translate into support for action. If leaders believe reducing school size is right for their district, they will have to go out into the community, present their ideas, explain the benefits, and reassure people that they will be sensitive to the issues of cost, disruption and diversity.

She concludes by writing, "Leaders who believe that smaller schools can address [the issues that parents and teachers care deeply about] have a powerful case to make, but they still need to do just that—make their case."

Making the Case: The Leadership Challenge

Many of the smaller, more interactive schools that have emerged were created by small groups of parents or teachers. School superintendents in those communities may promote, assist or tolerate programs that are not part of district-wide initiatives. However, for significant changes to occur in programs and facilities on a wider scale, superintendents will play the lead role.

The most critical issues for leaders in most districts will be setting an agenda and choosing a starting point. Are changes in school programs and size so fundamental that they require systemic changes in order to have a positive

impact? Can they work when implemented piecemeal? Will a community support sweeping reform in programs and facilities? Even if all new schools are small, how will districts integrate existing sprawling complexes into their plans?

The challenges to education leaders are enormous, and the response to those challenges will vary widely based on community needs and perceptions. Building public support for new programs and facilities requires vision, political savvy and fortitude.

An important consideration for school leaders is whether and when to use outside experts in programs or facilities to help guide or moderate public input. We have applied our planning approach to help define educational vision and objectives in the broadest terms, as well as applying that vision more narrowly to a specific facility. When appropriate, we have enlisted the support of leading educators to help us facilitate a broader review of educational goals and objectives.

We believe that including the architect in discussions at the earliest stages offers clear benefits. When we understand the context and nuance of local deliberations, we are better able to align facilities with programs. We are also better able to respond to specific local concerns about disruption, time and cost and to propose alternatives to achieve the goals identified.

Administrative Complexity: The Management Challenge

Reaching consensus on educational objectives and how to achieve them is only the first step, however, in designing schools that fit school leaders. A shift from larger schools to smaller in most school districts presents an imposing administrative challenge. One possible solution gaining support in larger districts is to create "schools within schools" in existing buildings. That is no less complex a task administratively.

Smaller schools appear to benefit from greater autonomy in managing the school, bringing decision-making closer to students and teachers. Reaping that benefit requires administrators to relinquish some control in the operation of decentralized schools. At the same time that schools need greater autonomy, however, they may need greater support to implement new structures and measure results. New standards of accountability may be required. Different levels of staffing and new types of training may also be necessary.

While these issues may be outside the purview of architects in designing a building to fit programs, they remain important issues for administrators that must be considered in the planning process. They do, however, also have an impact on school design.

Independent and Flexible Management

Decentralized management requires a different arrangement of administrative spaces, placing them closer to the teachers and students. Placing more decisions in the hands of teachers also requires administrative office space for them – especially given the shift away from teachers having proprietary classrooms.

To facilitate decentralized management, schools are considering new arrangements of space.

- Roseville Area High School, which was renovated to create "houses," created three administrative areas, instead of one, and also added administrative space for faculty in each house.
- Hopkins High School created "pods" which group classrooms. One of the four pods operates as an alternative school with some autonomy in decision-making. Each of the pods is linked to faculty offices.

An additional issue that requires attention is a school's use by the community. If the school is designed to be a center of community and meet community learning needs beyond those of school age children, it needs to be designed with that in mind. For instance, at Oak Point Intermediate School, areas within the school can be accessed easily for community education programs in the evening. At Crossroads Elementary, the area designed for family learning and early childhood programs is set apart from the houses that serve school-age children and has its own identity.

Safety and Security

A primary concern in every district in which we have worked is safety and security of people and facilities. While research indicates that smaller schools have better records on this score, in part by reducing the alienation of students who do not feel that they fit in, safety remains a worry wherever change in traditional school structure or management is contemplated. With less regimentation in school schedules, the concern is that it will be more difficult to keep track of students and visitors.

However, fewer mass transitions—2,000 students erupting into hallways simultaneously—is one of the benefits of smaller schools. Schools that group students in pods or home bases in which the core the curriculum is taught enjoy the same advantages. Moreover, in smaller schools there is less anonymity. Everyone knows who belongs there. Someone who doesn't is easily and quickly identified.

Careful attention to the flow patterns of students in a school can enhance security, whether in a school such as IDDS in Minneapolis where there are no bells and mass transitions or in schools such as Hopkins High School or Crosswinds Middle School where most learning activities occur in pods or home bases separated from the rest of the school. The "space between" is as important as the places it connects, both from a visual perspective and for security reasons. Particular attention must be paid to the incorporation of common spaces, where students from different pods or home bases meet. In Crosswinds School, for instance, the cafeteria is a central open area visible from all sides.

Security is generally enhanced by having open spaces that are not closed off to view of teachers and other students. The challenge for architects is to define those spaces, so that they don't seem large, cavernous and impersonal. In the Crosswinds cafeteria this was accomplished in part by placing dynamic shapes on the walls. The control booth at the back of the cafeteria which is used for all-school gathering and presentations is a tilted cube that adds visual interest. On a smaller scale, Crossroads Elementary School includes smaller spaces with bean bag chairs where students can get away to read without being out of sight.

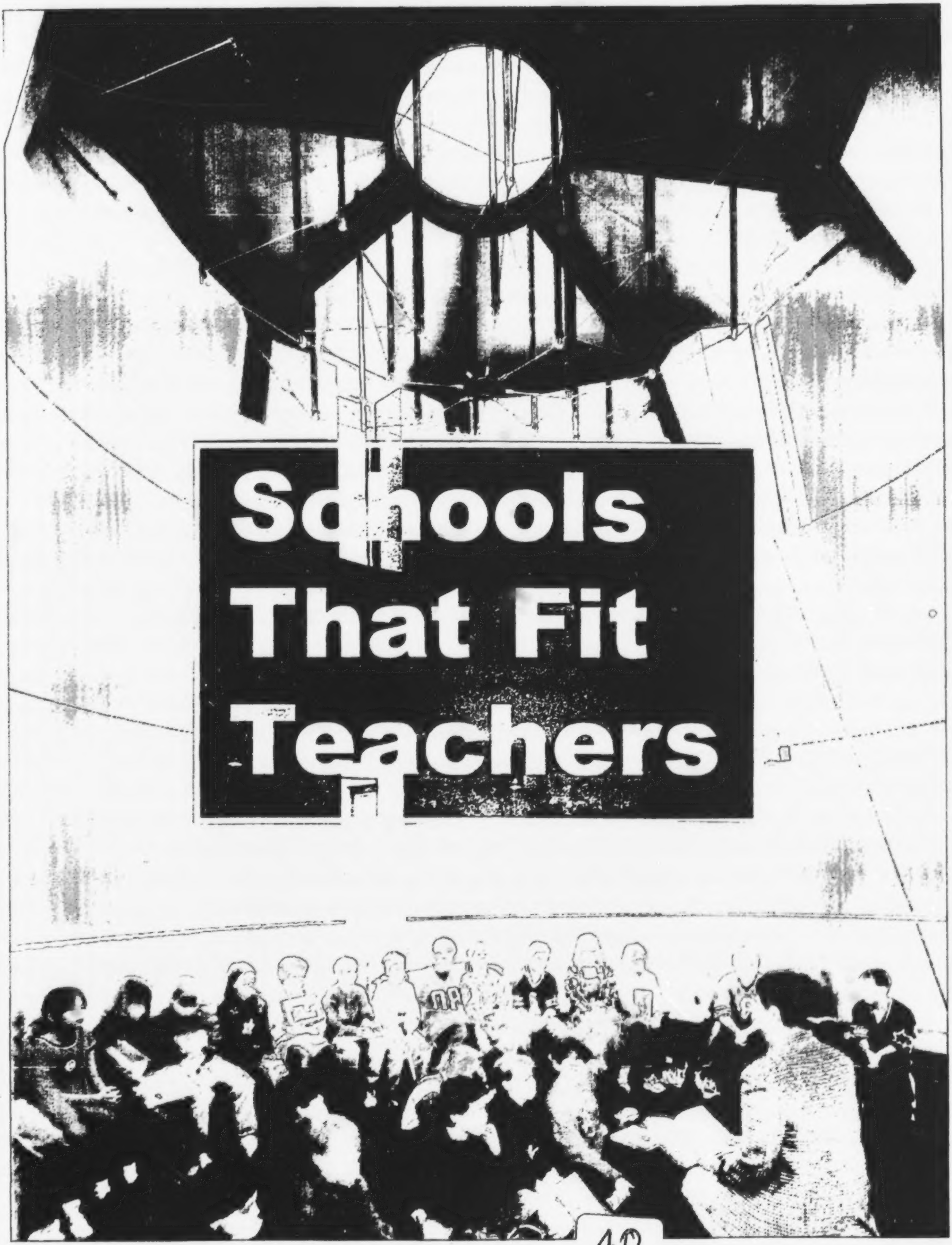
The addition of reception areas at the entrances to schools, such as Roseville Area High School, Hopkins High School and IDDS in Minneapolis also augments security.

Fresh Perspectives

Schools that superintendents and school boards do not want, will seldom be built. Yet, a careful planning and design process can help them get the schools they believe are appropriate for their districts by focusing on learning objectives first, and then on how facilities can help achieve those objectives. Architects can assist them in their roles as leaders and visionaries, by ensuring that facilities complement a community's educational vision.

Architects can also make a significant contribution by arranging and defining space to improve the management of facilities. Design itself can facilitate or impede changes in management style that many innovations in education require. In their roles as managers, superintendents and principals should expect from us designs that enable them to operate schools consistent with their intent and purpose.

Schools That Fit Teachers



Personally, I'm always ready to learn, although I do not always like being taught.

Winston Churchill

No one in the school planning process faces a greater challenge than teachers. They are being asked, sometimes told, to change the way they work. Changes to traditional schools are redefining their jobs and often their training—and that must be a consideration from the outset of discussions of programs and facilities. The challenge in fitting schools to teachers requires a careful planning process that addresses their concerns—and prepares them for new challenges.

In many of the shining examples of what smaller schools can do, change was driven by teachers. Nancy Brogan, principal of the Ditmas School in New York, a middle school transformed into four schools of choice, suggests that having teachers lead reform efforts is a constant. Can smaller schools succeed when change is not driven by teachers? Teachers have the power to completely defeat new programs and facilities alike.

A critical element, therefore, in the design of schools is the input of teachers. They must be a part of Vision-Based Planning. The challenge is to select teachers who are not totally invested in the status quo.

Faculty concerns are especially critical when remodeling existing facilities. A staff already in place is more likely to resist change. "It's easier to incorporate the lessons of research where no building exists," says an assistant superintendent in a suburban district that has implemented new programs in both new and remodeled facilities. Teachers at new facilities are more likely to have chosen that facility and will be more amenable to the programs it was designed for. A 20-year veteran teacher at Roseville Area High School remarked to us upon the opening of the remodeled school, which included divisions into houses, "This is the first time I've used my lesson plans since I got out of college."

In Bloomington, teachers at one school objected vociferously to plans to shift grade structure. In the face of that vehement opposition, district leaders were put on the agenda of every staff meeting to answer questions and "take the arrows." Over time the volume of the opposition decreased and teachers began to express support for some elements of the program. By the time that the grade changes were implemented, that faculty was the most prepared to move forward.

Lee Fertig, director of the IDDS in Minneapolis, goes beyond advising that care be given to preparing teachers and staff for a non-traditional facility. In his experience, a different kind of teacher has greater success in a small environment with a diverse mix of students. He says the most successful teachers are not those who had been just teachers, but those who had what he calls broader "foundational" skills, such as former Peace Corps volunteers. "A different institution needs different skills," he says.

New Everything

The new curricula being implemented in many schools require a new flexibility from teachers in methods, use of time and space, and in relationships with both students and colleagues.

Much of the research on school size, as well as learning methods, can be distilled into the benefits of a closer relationship between student and teacher—a relationship that draws more on the teacher's coaching skills than lecturing skills. Smaller schools facilitate a closer relationship and greater investment in the student by teachers. And many teachers prefer smaller schools. "These schools ...help show how small schools and those that share facilities can be much more satisfying places for teachers," writes Joe Nathan in *Smaller, Safer, Saner Successful Schools*. "This is a critical issue as the nation considers how to attract and retain teachers."

Teachers in many cases are being asked to play the role of coordinator, coach and head learner instead of lecturer, interrogator and test giver. To make that role possible, teachers are often staying with one group of students throughout much of the school day, getting to know that smaller number of students better and working more closely with them to tailor learning to the student. This new relationship with students requires a new relationship with colleagues as well, working with interdisciplinary teams more than with colleagues within a discipline.

Moreover, teachers must play a lead role in answering the criticism that small schools offer less variety in curriculum. Research indicates that this fear may be misplaced, that a school of 400 can offer as broad a curriculum as larger schools—and make it more meaningful to a larger percentage of students. Smaller schools offer teachers the opportunity to tailor levels of learning appropriate to individuals or small groups of students. In the process, they may have to become learners as well in order to expand the range of learning for their students.

An Accumulation of Change

In fairness, the changes that teachers are being asked to make must be matched by a willingness to provide facilities that help them succeed. Planning interdisciplinary lessons, coordinating the use of common spaces and managing the learning programs of diverse students all require space that does not exist in most traditional school buildings. The greater need for spaces appropriate to the demands on teachers, however, depends on the educational programs that schools choose to implement. The best school designs for teachers, therefore, are those that help them meet the needs of learners, however envisioned. As in everything else we have discussed, the needs of learners are paramount.

Schools That Fit Learners

No bird soars too high if he soars with his own wings.

William Blake

Most important of all, schools have to be designed and built to fit learners—fueling and directing their innate curiosity. The creation of ideal learning spaces is, of course, the goal of those who advocate smaller schools as well as those who recommend changes in curriculum to accommodate different types of learning. It is our goal as well. In addressing each issue to this point, our intention has been to enhance learning. When the planning process works as it should, all the discussions, planning, and meetings—the entire vision and planning process—have focused on learners and learning.

Now the task is to translate all we have learned into design. Of necessity, design comes last. It would be a serious mistake, however, to assume that the bulk of the work is done by the time the designing begins. An effective, productive planning process is wasted, despite the many wonderful insights it may produce, if it is not translated into design. We have tried to emphasize the point in the examples we have cited so far by noting the design elements that resulted from the unique fit we were trying to achieve.

The design of learning spaces in many progressive schools can be reduced to two fundamental issues, creating spaces that:

- Optimize relationships, particularly between student and teacher, but also among students
- Help learners make connections, among the things they learn, and between their learning and their lives.

Relationships: The Benefits of Being Known

Research on smaller schools suggests that one of the primary benefits is a closer bond among students and between teachers and students. It is based on a very simple and intuitive concept that's been proven in practice: in a smaller group, each individual matters more. The practical lesson many have drawn from that conclusion is that from an organizational and architectural perspective the size of a building may matter less than the size of the functional units within that building. Many school districts are trying to apply that lesson through compromises on school size and organization without undertaking massive rebuilding programs.

Many school districts are reconfiguring buildings and building new ones to allow for smaller functional units apart from total enrollment in a building or class size. One result is the house or pod structure in schools, such as in Roseville Area High School, Hopkins High School, and Crosswinds Middle School, as well as the home bases of Crossroads Elementary School. Minnetonka High School features clusters of classrooms with a staff-student resource center at the core of each cluster.

In each, the majority of learning occurs in smaller groups of students working with an interdisciplinary team of teachers. In those schools, learning areas include space for individual, small group and large group learning. These spaces create a networked environment for distributed learning, much as computer systems share and distribute resources and information. Each student is connected more closely with fellow students and shares a closer relationship with a team of teachers.

Connections: The Ways We Learn

A second distinctive feature of non-traditional programs is that they often provide multiple learning pathways. They recognize that students acquire knowledge and make connections in many ways. Cognitive learning is augmented by psychomotor and affective learning, where we learn by doing and feeling.

The traditional school design that many communities are now reconsidering was created at a time when activity was common for many children as they participated in a family business or farm. What children lacked in those days was access to information. Most of today's children, however, experience a dearth of activity, not information. They need more opportunities to touch, to construct and to test the information that inundates them.

Greater appreciation for multiple learning styles at all age levels has resulted in more learning spaces without desks in rows—and often without teachers being the only conduit of information. Many new school programs also place a greater emphasis on project-based, interdisciplinary learning—a development that also requires a new configuration of spaces.

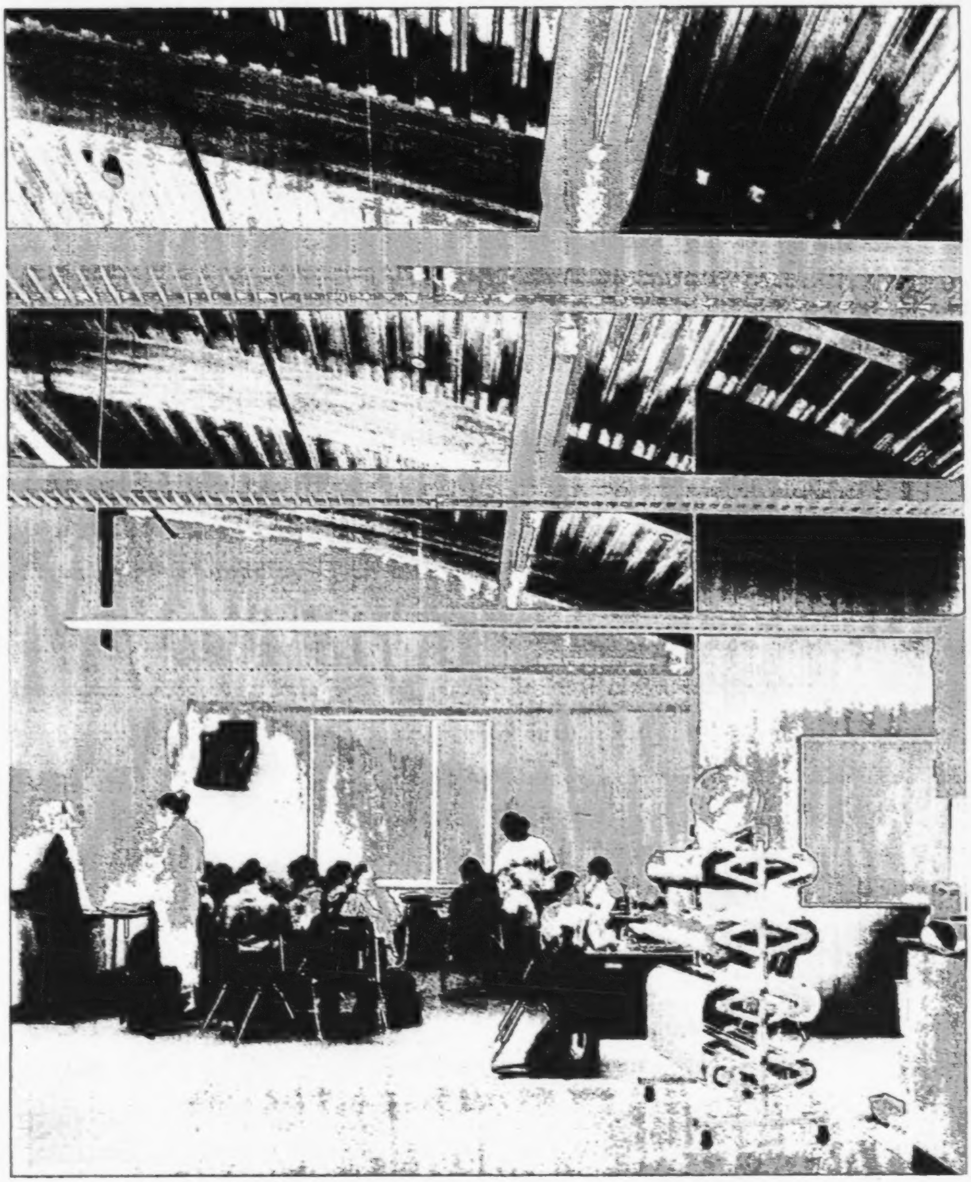
Physics and the Automobile

In a renovation of Roosevelt High School in Minneapolis, a connection between disciplines was aided by linking the physics classrooms and the auto shop. Not only did it encourage students of both subjects to see the relationship between subjects, but the linking of the spaces encouraged students of both subjects, often quite different groups, to interact more and appreciate those interactions.

These are just a few examples of how space is being reconfigured from the traditional to enable more hands-on, project-based learning. We have participated in many more school-design projects that allocate space to more active learning.

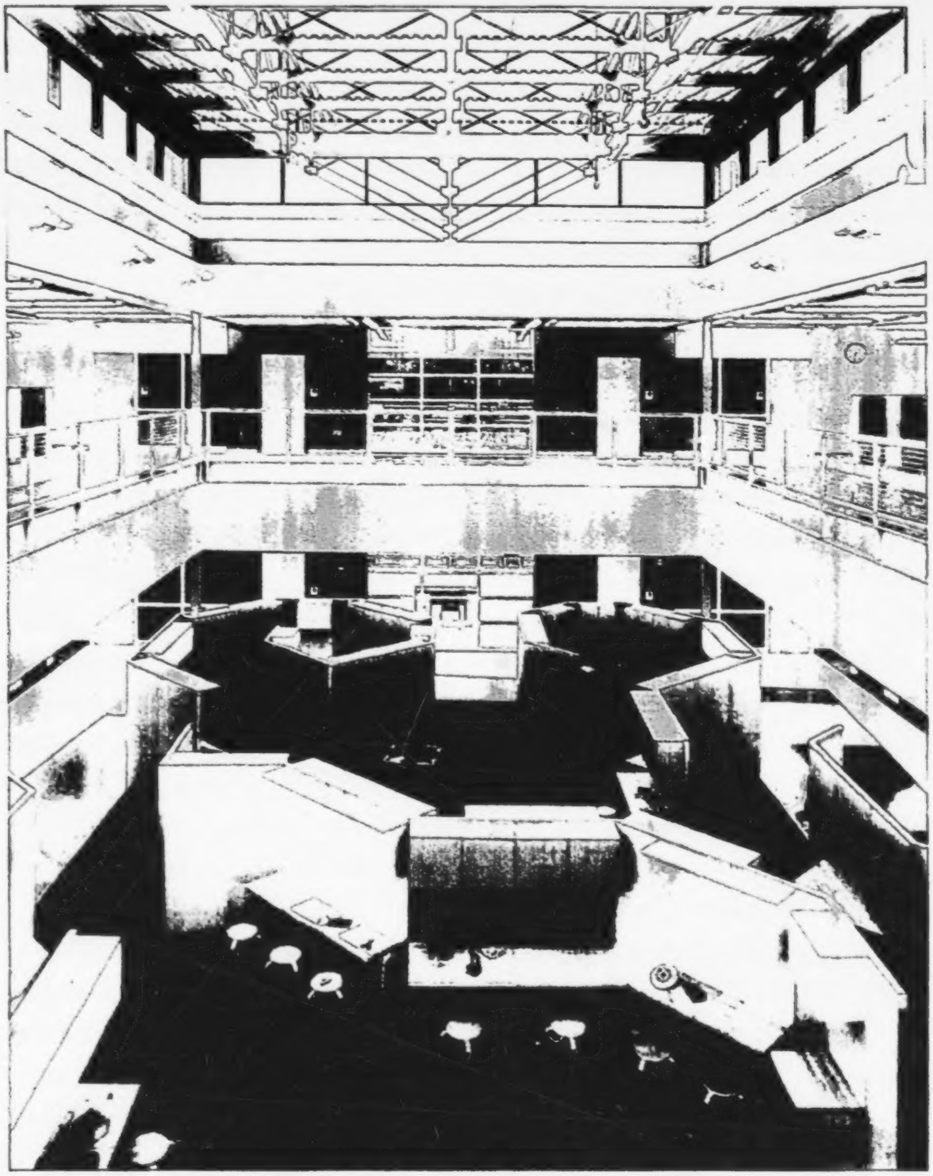
- Minnetonka High School includes a "black box" lab, which provides opportunities for informal and experimental performance as well as classes.
- Roseville Area High School incorporates small-group meeting rooms into classrooms that facilitate more team projects and peer teaching.
- IDDS includes five Focus Labs for hands-on learning at all age levels.

Connecting learning to the world in which children live has been another important consideration in many new schools. We've already mentioned how the IDDS school creates connections between the school and its urban environment in much the same way that Crosswinds school makes the most of its location adjacent to a park, wetland and lake. In like manner, Crossroads school creates a greater link to the community by its location and by bringing the community into the building through ECFE and ECSE programs.



The Medium and The Message

Crosswinds Arts and Science Middle School was designed to focus learning around projects. Each of the houses features lab or discovery space where students work alone or in smaller groups exploring subjects. The students then develop language and presentation skills by reporting on their projects to larger groups of students in presentation areas within each house. Spaces were created specifically to suit a hands-on, project-based learning methodology that engages students on multiple levels. The labs in each house are augmented by an outdoor lab that takes advantage of the school's unique location adjacent to a park and wetland.

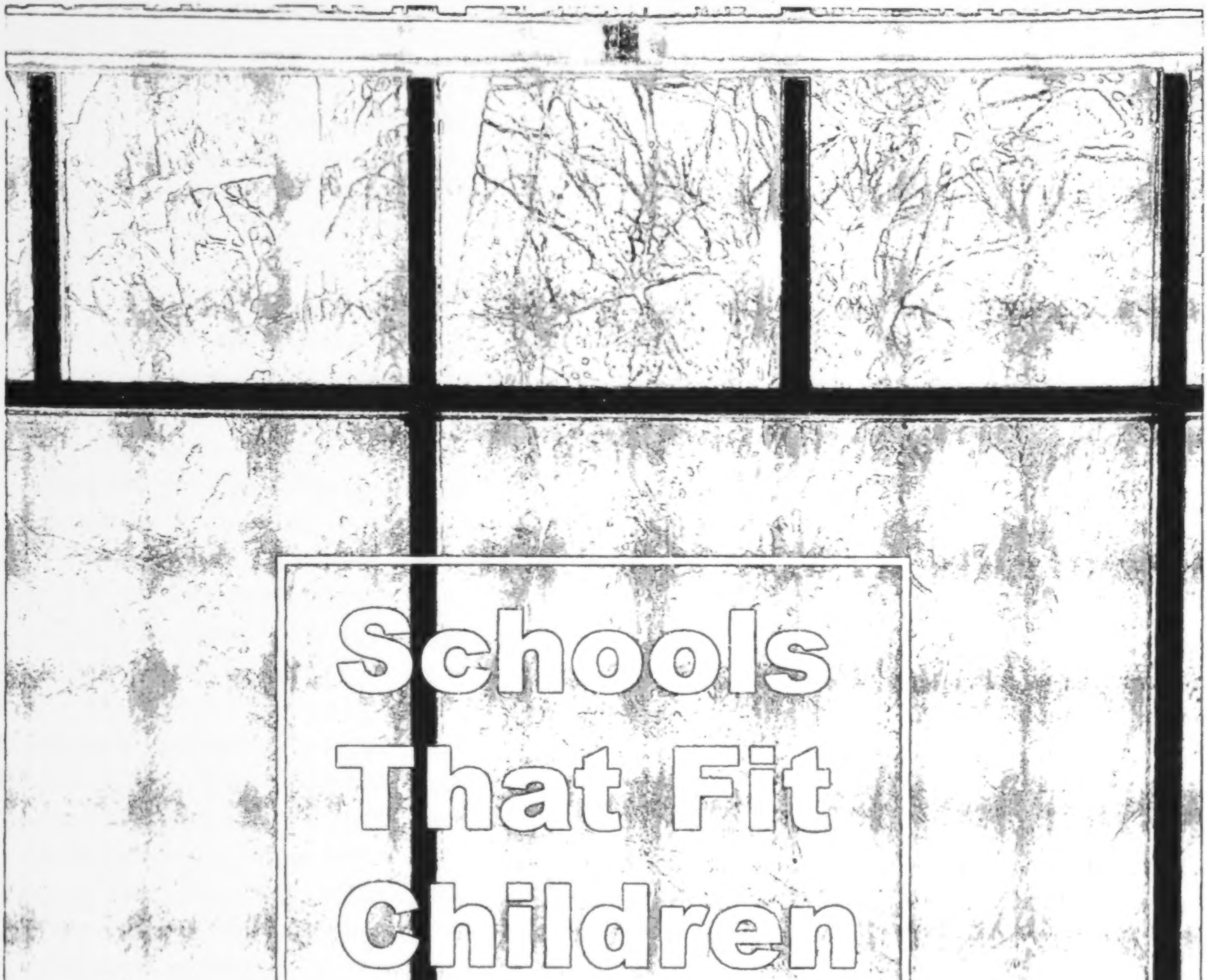


Inquiry Encouraged

Crossroads Elementary School features a quite different organization of space that also encourages learning on multiple levels. The Science and Montessori houses are separated by a central Inquiry Zone or I-Zone. The two-story I-Zone features hands-on learning stations for arts and science projects, a media center and an outdoor learning area. The I-Zone features brightly colored work stations arranged to provide an intimate environment where children can explore and learn with their senses rather than simply acquire information.

It's All About Learning

Learning and learners are at the core of any discussion of programs and facilities. In our view, how we learn and the relationships critical to learning are both significant factors that help determine ideal learning spaces. We create the right fit for learners when we design spaces that engage students—with their teachers, with their classmates, with their subjects or projects and with their world.



Schools That Fit Children

These are the days that we must savor.

Van Morrison

Fitting schools to learners focuses on learning styles and how to engage learners—mind, body and senses. We should not forget, however, that the learners who are the focus of our efforts are for the most part also children. Certainly, many high school students view themselves as adults—and adult learners may also be served by cooperative programs in schools. You only need to go to Disney World, however, to see that what appeals to children never loses its ability to pull in adults, too. Wouldn't it be better if our schools incorporated some of the appeal of Disney properties instead of looking more like prisons inside and out? Yet, traditional schools have often ignored an appeal to the child and his comfort, his security, his need to be stimulated and his inclination to play.

Architects usually have greater latitude in designing schools to fit children than in designing to fit the other audiences we have mentioned. Schools can be designed to fit children regardless of other educational choices. We don't believe, however, that design elements intended to fit children are merely cosmetic. It stands to reason that a warm, secure, stimulating learning environment could enhance efforts to improve learning and make school a place where children like to be. From the earliest age, children learn by playing. To remove playfulness from learning and the settings where learning occurs, is to distance the child from learning itself—regardless of age.

The Goldilocks School: Just Right

Many design features intended to fit children will be similar from place to place, yet local culture and identity should play a role, as they did for us in designing the elementary school in Heinävaara, Finland and the Mille Lacs schools. Those schools incorporated unique elements of local culture, such as a bread-baking oven and a ceremonial pipe space. But many elements of the Goldilocks School, where everything is just right, are common to children everywhere.

Appropriate scale, colors, lighting and textures combine to give children a sense of comfort and stimulation.

Selecting an appropriate scale for children can impact both exterior and interior design. In Oak Point Intermediate School in Eden Prairie, Minnesota, curves break up interior spaces to make them feel smaller and more intimate. Even the window designs, which have lower windowsills, contribute to the child-friendly feel.

In the Eisenhower Elementary School media center a reading nook is built on a smaller scale as a comfortable retreat. The solstice room is twelve feet in diameter with windows at the cardinal points. It was also designed with a unique feature that provides children with an unusual connection to the place. A stainless steel star is inlaid into the wall so that the sun shines on that star on the birthday of a former student who died of cancer. There is no sign or label to tell the story, but older students relate it to younger ones. It has become a part of the history and identity of the school.

Color can also enhance the playfulness of space, as well as help to define space. Vivid colors at Crossroads Elementary School brighten the two program houses and enliven the I-Zone. Bright red helps identify the entrances to Crossroads and Heinävaara schools. The Samuel Goldwyn Pre-school in Los Angeles uses geometric shapes and primary colors to present a playful and inviting exterior.

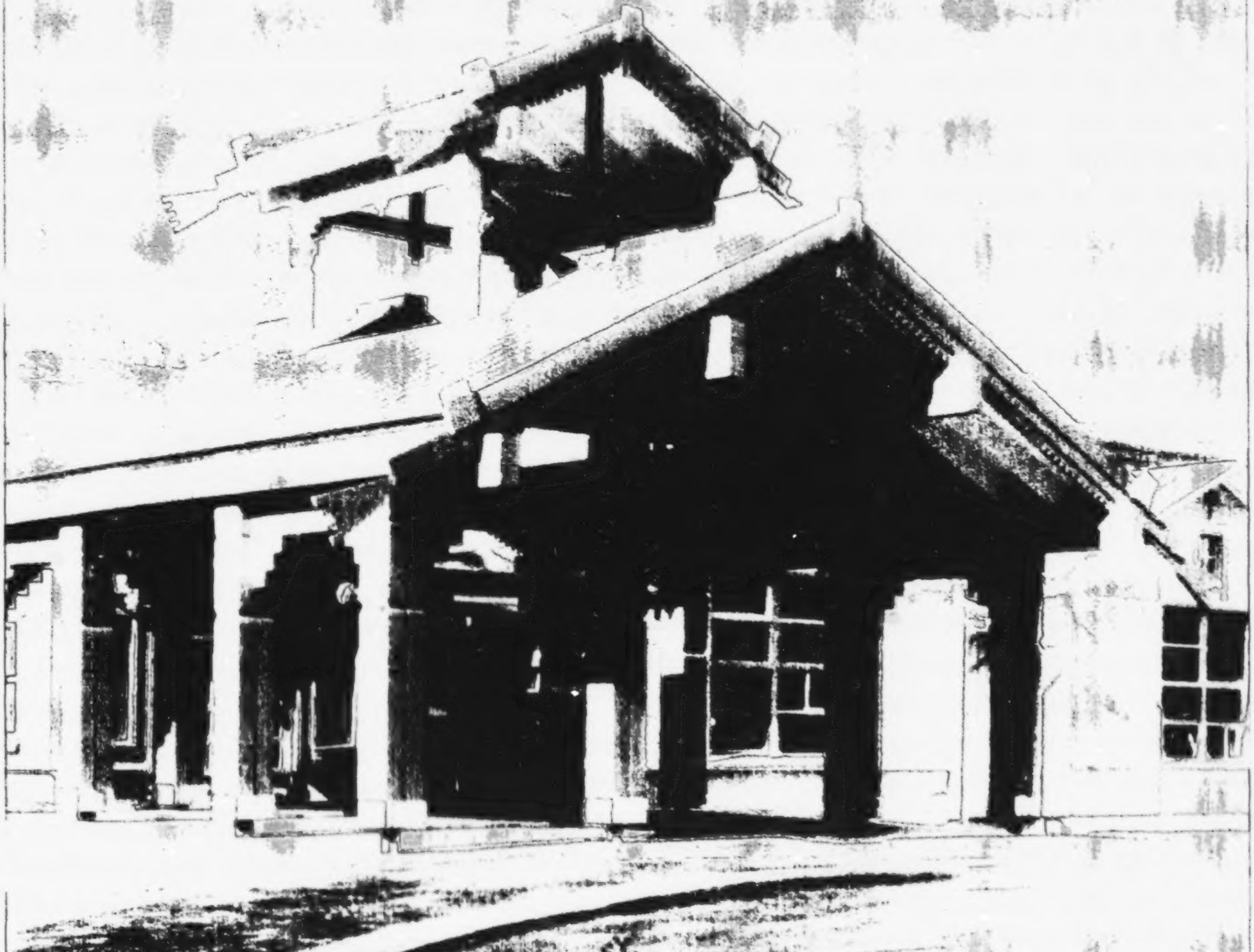
Light is another element that can contribute to the atmosphere and appeal of schools to children. The benefits of natural lighting are captured in the IDDS, where a careful study of light patterns among the buildings of downtown Minneapolis led to the strategic placement of windows so that on many days the school can operate without artificial lighting. Natural lighting also played a considerable role in the design of the cafeterias of high schools in Roseville, Eden Prairie and Minnetonka where large windows are the dominant features. In Kotzbue, Alaska, bringing in as much light as possible was an important consideration, especially in the cafeteria where most students would be sometime during the few sunlit hours of winter.

In the library of Hopkins High School table lamps provide much of the artificial lighting to create a cozier, more intimate atmosphere.

With each of these design features, plus an attention to a variety of finish textures and furnishings, we have been able to make school a place as comfortable and secure as home, and as playful as children need it to be.

Designing schools to fit children is the finishing touch to a design process that from planning to execution endeavors to create spaces that fit Learners – and all those who make the decisions on how our children will learn.

A New School



The important thing is not to stop questioning

Albert Einstein

Our interest in designing facilities that help unleash innovative programs compels us to encourage communities to see the vast potential for improvement in education and to pursue that potential vigorously. When they do so, we will try to lead them through a process of designing facilities that will help them achieve the objectives of their educational vision. And we will attempt to design facilities that further their program goals. At times our experience will guide them. At times their interests and insights will direct us.

There will certainly be times when the communities we work with will not take change in programs or facilities as far as we would recommend. When they do not, it is our responsibility to design for them the best facilities we can to meet the goals they set.

Some communities, as well as educators, take the position that relationships among students and teachers and the school environment are the most critical to learning. Others argue that the way students actually learn should take precedence in planning programs and curricula. Some mixture of those positions is a certainty in every community that is addressing its educational needs. As architects, we believe we can make significant contributions to education by designing schools that uniquely facilitate improvements in organizational structure, learning methods—or both.

Designing new schools is a process full of compromises—for education leaders and the communities they serve. On one issue, however, most hold an unwavering position: innovation in design must match innovation in programs. Facilities must be aligned with programs. Just as new programs grow from a willingness to consider new organizational structures and learning styles, so the design of facilities must grow from a willingness to examine the purpose and function of spaces from those perspectives.

In our experience across the United States and abroad, concerned citizens, parents and educators work hard at doing the right thing for their children and their communities. In the hope that we can add substance to their discussions and perspective on their deliberations, we have presented some of the lessons we've learned not only about designing schools, but about the process and the planning that is required to align facilities with programs, to align architecture with education.

We do not presume that our solutions or experiences are unique. Other architects could present examples of their work that have also drawn on the lessons of educational research and tried as forthrightly to meet the goals of communities. We have not represented the work of others here, however meritorious, because we do not know the process by which they arrived at their designs or the fit they were striving for.

Neither do we claim success in all the projects we mention. Success can not be measured in the short time many of these schools have been in operation. Many of our projects are still works in progress. But then so is education. So are the lives of the students who we hope are the beneficiaries of our work. And therein lies the only true measure of schools that fit.

Sources

Children are our most valuable natural resource.

Herbert Clark Hoover

Books

Seminal works on secondary schools and middle schools respectively that have fueled considerable additional discussion and research.

Breaking Ranks: Changing an American Institution; National Association of Secondary School Principals, 1996

Turning Points 2000: Educating Adolescents in the 21st Century , Anthony W. Jackson and Gayle A. Davis, A Report of Carnegie Corporation of New York, Teachers College Press, 2000

Position Papers and Literature Reviews

Many authors and organizations have done a thorough job of summarizing research and compiling resources for additional study on the subjects we have addressed. It is not our intention to duplicate their efforts. The following publications provide a summary of research as well as references to many other resources for detailed study.

Making the Case for Small Schools, Bill and Melinda Gates Foundation, 2001, www.gatesfoundation.org. Cites many sources for additional research.

School Size, School Climate, and Student Performance, Kathleen Cotton, School Improvement Research Series, NW Regional Educational Laboratory, www.nwrel.org. A comprehensive summary of research on school size as well as links to other research and sites of related interest.

Seven Topics in Education: A Review of Literature for School District 112, Center for Applied Research and Educational Improvement, University of Minnesota, December, 2001, www.district112.org. A thorough review of literature on school size and other issues.

Successful Schools: Smaller, Safer, Saner, Joe Nathan and Karen Febey, National Clearinghouse for Educational Facilities and Center for School Change, Humphrey Institute of the University of Minnesota, November 2001, www.edfacilities.org and www.hhh.umn.edu/centers/schoolchange. An analysis of the success of small schools and schools that share facilities, including an excellent resource list. The Web site of the NCEF provides links to many more publications on the subjects.

Additional Sources

School Modernization, The American Institute of Architects, 2001 Legislative Priority Issues, www.aia.org

Research: Smaller is Better, Debra Viadero, Education Week, November 28, 2001, www.edweek.org

Will Parents and Teachers Get On the Bandwagon to Reduce School Size?, Jean Johnson, Phi Delta Kappan, January, 2002

More Internet Resources

Starting points, with many links, for different perspectives on education and facilities.

Association for Supervision and Curriculum Development, www.ascd.org
Council of Educational Facility Planners, International, www.cefpi.org
National Association of Elementary School Principals, www.naesp.org
Rural School and Community Trust Facilities, www.ruraledu.org
Small Schools Network, www.smallschools.com
U.S. Department of Education, Smaller Learning Communities, www.ed.gov
The New Rules Project, www.newrules.org

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